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# MORE CARE IS NEEDED IN HANDLING WESTERN CANTALOUPE

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## SUMMARY.

THE annual production of cantaloupes in the western states of New Mexico, Arizona, California, Nevada, and Colorado is approximately 4,000,000 standard crates of 45 melons each.

More than 10 per cent of these melons reach the consumer so green that they are practically worthless for food.

To insure desirable eating and keeping quality, western cantaloupes for long-distance shipment should be picked just before they reach the full-slip stage of maturity.

The carrying and keeping quality of cantaloupes is directly dependent upon the care exercised in harvesting and preparing them for shipment.

Many weaknesses in present commercial practices can be corrected readily, and serious losses from deterioration or spoilage prevented.

The most careful handling of cantaloupes is as essential in all operations of distribution to dealers and consumers as in preparing the melons for shipment.

The time which elapses between picking and loading of cantaloupes into iced refrigerator cars determines very largely the amount of overripe and decayed melons delivered at the markets.

After picking, cantaloupes should be loaded as soon as possible into iced refrigerator cars for shipment.

Cantaloupes should not be wrapped. Wrapped cantaloupes do not refrigerate as well in transit nor do they reach consumers in as good condition as do cantaloupes not wrapped.

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## GENERAL CONSIDERATIONS.

THE United States Department of Agriculture estimated the total cantaloupe production of the United States for 1916 at approximately 8,000,000 standard crates of 45 melons each. The total production for 1917 was forecasted on July 1, 1917, at an increase over 1916 of over half a million crates. Of the total annual production, 4,000,000 crates, or approximately one-half of the crop, is produced in the States of Colorado, New Mexico, Arizona, Nevada, and California. The larger part of the crop from these Western States is shipped to Middle Western and Eastern markets.

The requirements and commercial practices of harvesting and preparing cantaloupes for shipment are similar in most respects in all of the large producing sections of the West. This is especially true with regard to the fundamental factors of maturity at time of picking, the care exercised to prevent injury in all handling operations, the wrapping, and the promptness with which cantaloupes are loaded for shipment.

During the shipping season of 1916 the United States Department of Agriculture conducted some preliminary investigations to determine the relation of the commercial practices of harvesting and preparing cantaloupes for shipment to carrying and keeping qualities in transit and during distribution to consumers. These investigations were continued on a more extensive scale during the shipping season of 1917 in the principal producing sections of California, Arizona, and Colorado, and at centers of consumption, including New York, Philadelphia, and Pittsburgh, in order to demonstrate the practicability of

improving the present commercial handling practices and thereby reducing losses in transit. This publication presents some of the more important results of these investigations.

**CANTALOUPEs FOR LONG-DISTANCE SHIPMENT SHOULD BE PICKED  
JUST BEFORE FULL SLIP.**

It has been ascertained through careful investigation that at certain periods fully one-fourth of the cantaloupes are so immature when they reach consumers that they are not palatable or even of fair eating quality. This is largely due to the fact that often, in fact usually, cantaloupes are picked so immature that they do not ripen properly after arrival at market. When cantaloupes which have been picked too green reach market their flesh lacks proper color, texture, and flavor. Instead of ripening normally they shrivel and the meat remains tough, lacking entirely the rich cantaloupe flavor. While it is necessary that they be picked before they are fully ripe in order to insure the necessary keeping quality in transit, they can be picked at a stage of maturity that will insure good flavor as well as keeping quality.

To insure the best eating quality when they reach consumers, cantaloupes should be picked just after they will slip cleanly from the stem; that is, at the full-slip stage of maturity. If properly handled and promptly loaded, they will carry in satisfactory condition even to the far Eastern markets. Allowance must be made, however, for a certain amount of rough handling and for some delay in transit. As a general rule, therefore, cantaloupes should be picked just before they reach the full-slip stage. Such melons will possess not only desirable eating quality, but also the necessary carrying quality.

Ordinarily many cantaloupes are picked at various stages of maturity before that of full slip, or at what is commonly called half slip. A considerable percentage of these never ripen in transit, and are practically worthless for food.

Green melons have a depressing effect on both demand and price. If only 1 per cent of the annual production in the Western States should be picked and shipped green, consumers would buy more than 40,000 crates of cantaloupes that have nothing to recommend them as food. Instead of only 1 per cent fully 10 per cent are green when they reach far-distant consumers.

If cantaloupes are to be in transit 10 days or more, it is advisable to pick them just before they reach the full-slip stage of maturity. This conclusion is based on inspections of comparative shipments of Pollock cantaloupes from the Imperial Valley and Turlock districts of California to New York City during the seasons of 1916 and 1917. Table 1 gives the average results of inspections of 29 shipments.

TABLE 1.—Average percentages illustrating the differences in firmness, color, decay, ripeness, and "cukieness" of cantaloupes picked on the full slip, just before full slip, and commercially, season 1917.

Time of inspection at New York City.....	Just after unloading from refrigerator cars.			Two days later.		
Viewpoint of inspector.....	Dealer.			Consumer.		
Picked .....	On full slip.	Just before full slip.	Commercially.	On full slip.	Just before full slip.	Commercially.
Cantaloupes:	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Too SOFT to be desirable..	12.7	9.7	13.4	17.7	11.6	20.7
Too YELLOW from standpoint of ripeness.....	11.5	2.2	6.1	27.0	10.7	14.9
DECAYED enough to spoil for food.....	.1	.1	.3	3.1	.4	5.1
MEAT Too RIPE to be desirable .....	Not recorded.			3.5	1.1	1.4
MEAT "CUKIE" or of tough, immature texture	Not recorded.			.1	1.9	13.9

## CANTALOUPEs SHOULD BE HANDLED MORE CAREFULLY.

The carrying and keeping quality of cantaloupes is directly dependent on the care exercised in harvesting and preparation for shipment to prevent mechanical injuries. The present commercial handling practices are unnecessarily rough, and are responsible for a large amount of decay and spoilage of cantaloupes in transit and after arrival at market. These conclusions are based on inspections of comparative shipments of Pollock cantaloupes from the Imperial Valley and Turlock districts, California, to New York City during the seasons of 1916 and 1917. Table 2 and figure 1 give the average results of 20 experimental shipments from Turlock, Cal.

TABLE 2.—Average percentages of deterioration in 20 experimental shipments of carefully and commercially handled cantaloupes shipped to New York City during the season of 1917.

Time of inspection.....	Just after unloading from refrigerator cars.		Two days later.	
Viewpoint of inspector.....	Dealer.		Consumer.	
Handling in harvesting and preparation for shipment .....	Commercial.	Careful.	Commercial.	Careful.
Cantaloupes:	Per cent.	Per cent.	Per cent.	Per cent.
DECAYED enough to spoil for food.....	0.5	0.0	6.0	0.4
MOLDED enough to affect appearance.....	2.4	.5	9.2	.3
SPOILED for food by BRUISING only.....	Not recorded.		11.7	3.5



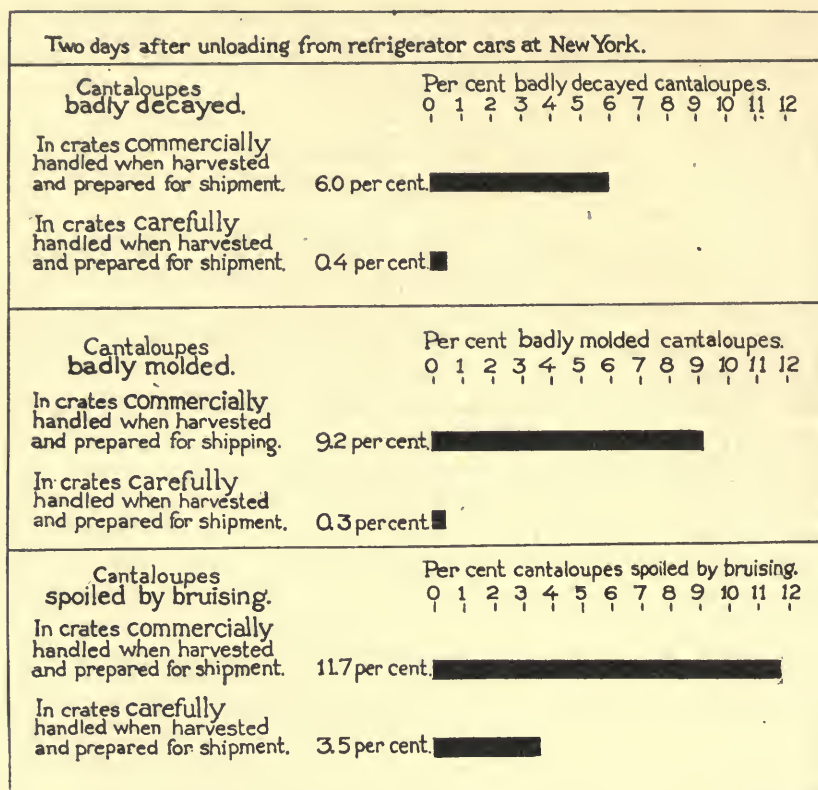


FIG. 1.—Diagram illustrating average percentages of deterioration in 20 experimental shipments of carefully and commercially handled cantaloupes shipped to New York City during the season of 1917.

From the standpoint of minimizing bruising or other mechanical injury, many weaknesses in present handling practices may be corrected readily by reasonable attention to equipment and labor.

The regulation lemon or orange picking bags, made of fairly heavy canvas and equipped with shoulder straps, are preferable to the burlap or grain sacks commonly used. Sacks without shoulder straps are constantly being raised and lowered and dragged over the ground by the pickers. A large percentage of commercially handled cantaloupes are bruised in this manner. Bags with shoulder straps leave the hands of the pickers free, and the openings at the bottoms permit the bags to be lowered into the crates and so lifted that the melons will roll out gently.

No cantaloupes should project above the top edges of the field crates. If this precaution is neglected, the top crates when loaded on the field wagon will rest on the projecting melons in the crates below, and serious bruising will inevitably occur.

When unloaded from field wagons crates should be stacked with care to avoid dropping or other jarring. Cantaloupes from field crates should be graded or emptied carefully into packing bins without unnecessary throwing, dropping, or rolling. The lining of packing bins should be made of soft material, or, if made of boards, should be well padded to prevent bruising.

During the operation of packing, cantaloupes should be placed carefully in the crates and not dropped or tossed into place, as is frequently done. Injury caused by squeezing can be prevented if packers are careful not to force in oversized melons when finishing crates.

Cantaloupes should be packed so that the tops of the crates bulge slightly when cover slats are nailed on. If the tops of the crates bulge too much, the cantaloupes become squeezed and bruised, which causes spoilage later.

Packed crates require just as careful handling as do individual melons prior to packing. They should be stacked only on their sides, as the side bulge is usually much less than that of the top and there is thus less chance of injuring the cantaloupes. Wagons used for conveying packed crates to car-loading platforms should be equipped with springs to reduce injury from jarring.

The greatest care should be exercised in stacking packed crates, in stowing them in cars, and in loading them on and off wagons. It frequently happens, through accident or carelessness, that packed crates are thrown or dropped into position. It is hardly necessary to call attention to the serious injury and deterioration resulting from such carelessness. This applies with equal force to the handling which crates receive during unloading from cars and during distribution to wholesale, jobbing, and retail stores.

#### CANTALOUPEs SHOULD BE LOADED INTO ICED REFRIGERATOR CARS AS SOON AS POSSIBLE AFTER PICKING.

The reduction of serious market losses from oversoft, overripe, and decayed cantaloupes is dependent to a large extent upon the promptness with which they are placed under refrigeration. The importance of prompt loading and cooling is generally recognized. The inspection data of experimental shipments of Pollock cantaloupes from the Imperial Valley to New York City during the seasons of 1916 and 1917 strongly emphasize this factor.

Table 3 gives the average results of inspections of 13 shipments of comparative lots delayed one, four, and eight hours before loading during the season 1917.

TABLE 3.—Average percentages illustrating differences in firmness, color, and decay of cantaloupes delayed for one, four, and eight hours before loading into iced refrigerator cars for shipment, season 1917.

Time of inspection at New York City.....	Just after unloading from refrigerator cars.			Two days later.		
Viewpoint of inspector.....	Dealer.			Consumer.		
Time between packing and loading into iced refrigerator car for shipment. }	1 hour.	4 hours.	8 hours.	1 hour.	4 hours.	8 hours.
Cantaloupes:	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Too SOFT to be desirable..	8.4	16.7	27.0	30.6	34.7	43.2
Too YELLOW from standpoint of ripeness.....	8.4	13.3	15.0	20.9	21.5	26.3
DECAYED enough to spoil for food.....	.0	.0	1.2	2.9	3.3	4.4

After picking, cantaloupes should be hauled without delay from the field to the packing shed, where they should be kept in the shade until packed. They should be packed as soon as possible, and, while being hauled from the packing shed to the car-loading platform, should be covered with canvas or other light-colored cloth to protect them from the sun. As soon as possible, after packing, cantaloupes should be loaded into iced refrigerator cars for shipment. The importance of this promptness is illustrated in figure 2.



FIG. 2.—Immediate versus delayed loading of cantaloupes. Note the greater shrinkage in the crate on the right as compared with the crate on the left. The crate on the right was not placed under refrigeration until 24 hours after the melons were picked, while the crate on the left was loaded three hours after picking. This photograph was taken two days after they were unloaded at destination.

#### CANTALOUPEs SHOULD NOT BE WRAPPED.

Wrapped cantaloupes do not refrigerate as well in transit nor do they reach consumers in as good condition as do cantaloupes not wrapped.

These conclusions are based on inspections of comparative shipments of Pollock cantaloupes from the Imperial Valley, California, to New York City during the seasons of 1916 and 1917. Table 4 and figure 3 give the average results of 13 shipments.





Free circulation of cold air around each crate and around each melon is essential to quick, effective refrigeration in transit. Wrapped cantaloupes cool more slowly than those not wrapped because the paper retards the free circulation of cold air and acts to some extent as an insulator, preventing the free transmission of heat from the melons.

Two days after cantaloupes involved in these studies were unloaded from refrigerator cars at the markets, the wrapped melons were slightly firmer than those not wrapped, owing to the fact that the wraps retarded to some extent the evaporation of moisture. The difference, however, is so slight that it does not compensate for the increase in decay and mold which wrapping causes.

It is not advisable to wrap cantaloupes, even though it is not possible to load them immediately after packing. This is shown by a comparison of the data in Tables 3 and 4. The figures show that two days after unloading from refrigerator cars the loss resulting from delay in loading is much less than the loss from wrapping. This loss would naturally occur in any wrapped cantaloupes, whether they were loaded for shipment immediately after packing or whether they were held in the open for a considerable time before loading, because the loss from wrapping occurs after the cantaloupes are unloaded from refrigerator cars at centers of consumption.

Most of the loss from wrapping occurs because of decay and mold which develop after cantaloupes are unloaded from refrigerator cars at centers of consumption. When, on summer days, crates of cold cantaloupes are removed from refrigerator cars, moisture from the atmosphere condenses on the surface of the melons. This moisture



FIG. 4.—Wrapped versus not wrapped cantaloupes. Those on the left were wrapped, those on the right were not wrapped. This photograph illustrates their condition two days after unloading from a refrigerator car. Note the mold on those melons which were wrapped.

soon evaporates from cantaloupes not wrapped, but from wrapped cantaloupes the evaporation is hindered by the paper, which tends to retain the condensed moisture. This retained moisture acts as a medium favorable to the growth of organisms which cause the development of decay and mold, as illustrated in figure 4.

Aside from causing losses through decay and mold, the practice of wrapping is undesirable because it enables unscrupulous persons to cover and pack defective cantaloupes which, if not wrapped, would be thrown out. Both in producing sections and at centers of consumption, it is more difficult for inspectors and buyers to examine wrapped crates than crates not wrapped.

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